REMARKS

In the Office Action of July 1, 2004, the Examiner rejected the claims 33-47 under several references that will be individually discussed in the sections below. The previously presented claims 33-47 have been cancelled and a new set of claims numbered 48 to 98 is presented that are more specifically directed to the subject matter of a multijunction solar cell connected to an integral "means for passing current," or bypass diode, as well as other aspects and configurations of the present invention. Reconsideration of the application in view of the new claims is therefore respectfully requested.

I.

Claims 33-37, 41, 42, and 44-47 were rejected under 35 U.S.C. § 102(b) as being anticipated by JP 9-64397, hereinafter referred to as JP '397.

Claim 48 recites a multijunction solar cell and means for passing current that is integral to a portion of the first subcell. The JP 9-64397A reference cited by the Examiner against the original claim 33 depicts a bypass diode 102 formed "on the same conductive substrate 103" but is not "integral" to any of the subcells as recited in claim 48. In an examination of Fig 1 of JP '397, there is depicted a solar cell 101 with layers 104A, 105A, 107A, 104B etc. The adjacent diode 102 has a completely different sequence of layers 105D, 104D, 107D, etc., which do not align with the layers 104A, 105A, 107A, 104B of the cell 101. Since there is no correspondence between any of the layers of the two devices (*i.e.*, the solar cell and the diode are evidently different semiconductor structures) the diode 102 is not integral to any portion of the first, or any of the other subcells, of the solar cell 101. Similar conclusions can be drawn by examining the structures depicted in Figs. 2, 3, 4, 5, 6, 7, 8 and 9

of JP '397. Thus, new claim 48, and the claims dependent thereon, are patentably distinguished from JP '397.

Similarly, independent claims 52, 57, 60 and 65 recite a semiconductor body with means for passing current or a bypass diode integral to a subcell, and such claims are patentably distinguished from JP '397 for the same reasons.

New claim 68 recites a "discontinuous lateral conduction layer", and claim 88 recites "... a lateral conduction layer deposited on said substrate....and forming a contact region...". The Examiner suggests that the substrate (203) of JP '397 can be coated with a metal (paragraph 0066), which would purportedly read on the "lateral conduction layer" of original claim 44. However, there is absolutely nothing in such paragraph that suggests that such coating would (i) perform any electrical function, or (ii) form a contact region for, or even contact a region of, the bypass diode. In fact, to the contrary, as set forth in paragraph 0067, the application of a conductive coating in the JP '397 device is not for electrical connection of components, but for improving reflectivity, and fabrication-related reasons. See the translation of paragraphs 0066 and 0067 attached hereto. With respect to claim 68, the layers of JP '397 are not "discontinuous."

Accordingly, claim 68, 88 and similar claims 89-98 are patentably distinguished from JP '397.

II.

Claims 33-37, 41, 42, and 44-47 were rejected under 35 U.S.C. § 102(b) as being anticipated by Taylor, GB 23460010 A, the Examiner noting Figures 1c and 1d and pages 5-6 of Taylor.

Taylor, GB 2346010, describes a solar cell arrangement that includes a top cell, a tunnel diode, a bottom cell and a monolithically integrated protection diode. The protection diode is formed by removing parts of the top cell and tunnel diode in a region.

The "protection diode" of Taylor does not appear to be electrically "connected" to the multijunction solar cell. In fact, page 5, line 13, of Taylor suggests the fabrication of the device depicted that "define[s] and isolate[s] a protection diode..." The word "isolate" does not suggest that the diode is electrically "connected" to the cell, but is in fact electrically "isolated" from the cell. Moreover, Taylor recites that contacts are added so that external connection may be made to the cell and to the protection diode. If the diode of Taylor were integral to the cell, an external connection to the diode would appear to be unnecessary. Accordingly, applicant's new claims are patentably distinguishable from Taylor.

III.

Claims 33-38, 41, 42, and 44-47 were rejected under 35 U.S.C. § 102(b) as being anticipated by Hilgarth, EP 1056137 A1, and in particular Figures 8 and 9 and paragraphs 0053-0060.

Hilgarth's paragraphs 0053-0060 describe a solar cell 68 (in Fig. 8) with photoactive layers 78/80, and 82/84. Such layers are different and distinct layers from the layer 74 that forms one layer of the diode 28. Since there is no correspondence between the active layers of the two devices, the solar cell 68 and the diode are evidently different semiconductor structures, and the diode 28 is not integral to a portion of the first, bottom, or any of the subcells, of the solar cell 68.

The structure depicted in of Fig. 9 of Hilgarth does appear to have a junction 104 in the substrate 102, and also has a bypass diode 28. The diode 28 is formed from the contact of layer 108 and the metal layer 118 (see Figure 9 and the depiction and placement of the diode symbol), *i.e.*, a Schottky junction is formed and the diode is a Schottky diode. However, layer 108 of the diode is not "integral to a portion of" the first or bottom subcell of a multijunction solar cell, and therefore Fig. 9 does not anticipate claims 48-67 of the present invention.

The "lateral conduction layer" as recited in claims 68-92, and the "metal layer" as recited in claim 93, are not disclosed in such reference, and therefore such independent claims are also believed patentably distinguished from the applied reference.

IV.

Claims 33-47 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ho et al., WO 99/62125. The Examiner refers to Figure 14B as having the instant multijunction solar cell with a Ge substrate, and GaAs (1412,1414) and GaInP (1422, 1424) solar cells, and an integral bypass diode (1410) that is integral with a portion of the GaAs solar cell and laterally spaced therefrom. The Examiner suggests that either layer 1406, 1408 and/or 1430 read on the instant lateral conduction layer, and that layer 1440 reads on the instant metal layer.

In Ho et al., WO 99/62125, in Figure 14B, the diode 1410 has a back metal contact 1430 and a front metal diode contact 1440. An interconnect C-clamp 1442 is used to connect the front metal contact 1440 and the back metal contact 1430 so the bypass diode 1410 is connected in an anti-parallel configuration with respect to the photovoltaic portions of the solar cell 1400.

New claim 48 recites "a multijunction solar cell including a first photoactive junction formed in a substrate forming a first subcell" and "means integral to a portion of said first subcell for passing current".

In Ho's Fig. 14A, the first photoactive junction is formed from layers 1402 and 1404. The diode layers 1412-1420 lie over the layers of the first subcell, so the diode is not "integral to ... said first subcell". Accordingly, claim 48 and the claims dependent thereon are not anticipated by Ho.

Similarly, claim 52 recites a "bottom subcell" and "means integral to ... said bottom subcell". For the same reason as noted above, claim 52 and the claims dependent thereon are not anticipated by Ho.

New claim 57 recites "... a bypass diode integral to and directly connected to the base of the first solar cell." The bypass diode 1412-1420 of Ho is not directly connected to the base layer 106 (in Fig. 1) or 1402 (in Fig. 14B); instead, it is directly connected to back metal layer 1430. Accordingly, claim 57 and the claims dependent thereon are not anticipated by Ho.

New claim 60 recites "... a metal layer connecting said multijunction solar cell and said means for passing current, wherein one end of said metal layer is coupled to the base of said first solar cell and another end of said metal layer is coupled to one terminal of said means for passing current."

The conductor in Ho connecting the multijunction solar cell and the bypass diode is the C-clamp 1442, which is not a "metal layer" as recited in claim 60. More particularly, even what the Examiner refers to as the "metal layer 1440" of Ho does not have "one end... coupled to the base of said first solar cell" as recited in claim 60. Accordingly, Ho does not

depict or teach the "metal layer" element recited in claim 60, and such claim is patentably distinguished therefrom.

Similarly, the "lateral conduction layer" recited in claims 68-92, and the "metal layer" of claims 93-98 are not anticipated by any structure in Ho. Layers 1406, 1408, and/or 1430 do not read on the limitations recited in such claims.

V.

The Examiner also rejected Claims 33-47 under 35 U.S.C. § 103(a) as being unpatentable over Taylor, GB 2346010 A, in view of Marvin et al., "Evaluation of multijunction solar cell performance in radiation environments, Conference Record of the 28th Photovoltaic Specialists Conference, pages 1102-1105, published 15-22 September 2000, and Lillington et al., U.S. Patent 5,853,497.

The deficiencies of Taylor in describing a solar cell similar to that of Applicant have been described in Section II above. The teachings of the secondary references pertaining to Ge substrates or GaInP/GaAs solar cells do not pertain to features of connecting a multijunction solar cell to an integral bypass diode, or to the other features as set forth in the present claims. Accordingly, Taylor in combination with the secondary references does not disclose or teach Applicant's solar cell configuration as set forth in new claims 48-98.

VI.

The Examiner also rejected Claims 33-47 under 35 U.S.C. § 103(a) as being unpatentable over Hilgarth, EP 1056137 A1, in view of Marvin et al., "Evaluation of multijunction solar cell performance in radiation environments, Conference Record of the 28th

Photovoltaic Specialists Conference, pages 1102-1105, published 15-22 September 2000, and Lillington et al., U.S. Patent 5,853,497. The Examiner again refers to Figures 8 and 9 and paragraphs 0053-0060 of Hilgarth, which the Examiner alleges to set forth the features of Applicant's solar cell semiconductor device.

As noted in Section III above, the structure in Fig. 8 and 9 of Hilgarth are fundamentally different from Applicant's claimed invention. There is no teaching or suggestion in Hilgarth of modifications to such structures that would lead to Applicant's claimed design.

The "lateral conduction layer" as recited in claim 68-92, and the "metal layer" as recited in claim 93-98, are not disclosed in the Hilgarth reference, and therefore such features are unobvious over the cited references, and patentably distinguished therefrom.

VII.

Claims 33-47 were rejected as obvious-type double patenting under U.S. Patent Nos. 6,680,432; 6,278,054; 6,600,100; and U.S. Patent Applications S.N. 10/336,247, and 10/280,593.

Reconsideration of the double patenting rejection is requested in view of the newly submitted claims.

VIII.

The Examiner objected to the drawings for failing to comply with 37 C.F.R. § 1.84(p)(5) because they do not include reference character 207, which is described in the specification. Applicant has amended the specification to remove descriptions of reference character 207.

The Examiner objected to the drawings for failing to comply with 37 C.F.R. § 1.84(p)(5) because they include reference characters 111 and 203, which are not discussed in the specification. Applicant has amended the specification to refer to reference characters 111 and 203.

IX.

The Examiner objected to the specification because the cover page did not correctly reflect the name of one of the inventors. Applicant has amended the cover page of the instant application to correctly reflect the names of the inventors. The Examiner also noted that application serial number 10/280,593 has been allowed. Applicant will amend the References to Related Applications to reflect the patent number after that application issues.

X.

Applicants have attached a Patent Fee Determination Record (PTO/SB/06) for payment of extra claim fees. If there are any additional charges concerning this response, please charge to White & Case LLP Deposit Account 23-1703.

A favorable consideration of the present amendment together with the original application is respectfully requested.

Respectfully submitted,

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By: _____

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AMENDMENTS TO THE DRAWING FIGURES

Applicant submits herewith replacement drawing sheets for Figures 1, 3, 4, and 5. The drawing figures as originally filed inadvertently used the phrase "GaAs Lateral Conduction Layer" in the layer above element 104 in each of Figures 1, 3, 4, and 5. The phrase has been changed to correctly read "GaAs". Support for this amendment can be found on page 4, line 13 of the application as filed, which states that the lateral conduction layer is element 113.